Home Seismic Retrofit Program

Moderate earthquakes over the past 150 years have caused widespread damage throughout the Pacific Northwest, and experts warn such earthquakes are certain to occur again.

Case Studies

SEATTLE, WASHINGTON

In addition, recent scientific findings anticipate even larger earthquakes in the future. Earthquakes in California and elsewhere have graphically demonstrated the benefits of strengthening wood-frame houses to resist earthquake damage. This type of "mitigation" protects families, increases public safety, safeguards real estate investments, and fosters community recovery.

There are about 125,000 Seattle homes that may qualify for needing Home Retrofit, and the number increases to 250,000 if including King County. As one of the first Project Impact pilot communities in the country, the City of Seattle has embarked on an ambitious hazard loss reduction program spearheaded as a part of that effort. The City's Project Impact workgroup is composed of nearly 50 individuals representing a wide variety of organizations and institutions. These include major industries, lending institutions, insurance companies, academia, regional utilities, building contractors, community groups, city departments, consulting groups, and state and federal agencies.

Earthquake damage to this house's front porch.

Seattle, Washington

One of the projects generated from the Seattle Project Impact workgroup was the creation of a seismic home-retrofitting program. A Home Retrofit Advisory Council was formed to guide each of the four major elements of this program.

Home Retrofit Objectives:

- Develop the on-going capability among local builders, contractors, and homeowners to seismically retrofit homes;
- Implement consistent, effective mitigation measures;
- Simplify and accelerate the permit process for Home Retrofit projects (fast-track);
- Foster community support and involvement;
- Encourage other Washington communities to learn from Seattle's successes;
- Provide financial incentives and other resources to assist homeowners who retrofit; and
- Retrofit all vulnerable homes.

Bolting the house to the foundation.

Permits and Standards

An expedited building permit package was developed which includes a standard plan for strengthening weak structural elements that would sustain damage during an earthquake. By using the standard plan, a homeowner is granted a building permit almost immediately, instead of waiting the typical three weeks for review and approval.

Professional Training and Education

This program provides builders and contractors with a consistent, approved approach to the seismic retrofit of older, wood-frame, single-family homes. A Professional

Seattle, Washington

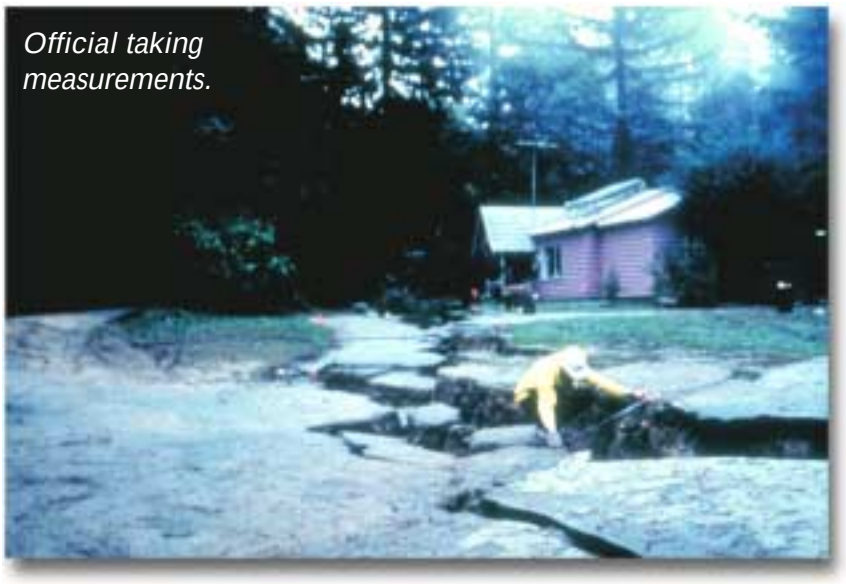
Seismic Retrofitting Training and Education Course for builders covers the following topics: basic concepts of seismic design, determining if a home qualifies for retrofitting measures, identifying what seismic retrofit work is needed, completing the expedited permit, and obtaining financing.

Self-help Training and Education. This program provides technical assistance and loan power tools to homeowners who want to seismically retrofit their own homes. The homeowners learn practical hands-on details for accomplishing house bolting and wall strengthening tasks.

Home Retrofit Accomplishments

During the past two years, public and private sector partners designed and implemented the Home Retrofit program with the following results:

- Home Retrofit classes for homeowners provides training on assessment and the retrofit process. Based on the information learned in the class, homeowners can either do the work themselves or hire a trained contractor. Those who perform the retrofit themselves can save additional money by using tools from a lending library.
    - **Over 1100 have attended the Home Retrofit class for homeowners.**



Official taking measurements.

- The Department of Design Construction & Land Use (DCLU) has adopted updated standards for seismic retrofitting of homes and a streamlined process for getting building permits.
    - **Nearly 245 Home Retrofit permits have been approved.**
- Home Retrofit professional training for builders and contractors is being taught at the University of Washington Extension. A list of trained contractors is provided to homeowners who would like assistance with completing their retrofit.
    - **250 contractors and builders have completed the professional training.**

• Special retrofit loan products are available through two area banks (Bank of America and Washington Mutual) and one credit union (Boeing Employees' Credit Union). In addition, Seattle Project Impact provided funds to the Office of Housing for a limited number of Home Retrofit grants for low-to-moderate income Seattle homeowners. Recognizing the lower income need, the Office of Housing now offers low interest loans to cover retrofit.

- **Nineteen houses have been completed through the Office of Housing/Project Impact grants.**

• To encourage other Washington communities to learn from Seattle's successes, 15 building departments outside of Seattle have joined discussions to expand the Regional Home Retrofit program in their jurisdictions. This expansion effort will continue the implementation of consistent, effective mitigation measures. Seven jurisdictions are already approving permits.

• To foster community support and involvement, there are two Disaster Saturdays a year, one in April and one in October. These free community forums provide an opportunity for residents to learn about the resources available to perform the Home Retrofit program as well as other mitigation topics.

Additional information is available on the Seattle Project Impact web site:
www.ci.seattle.wa.us/projectimpact/

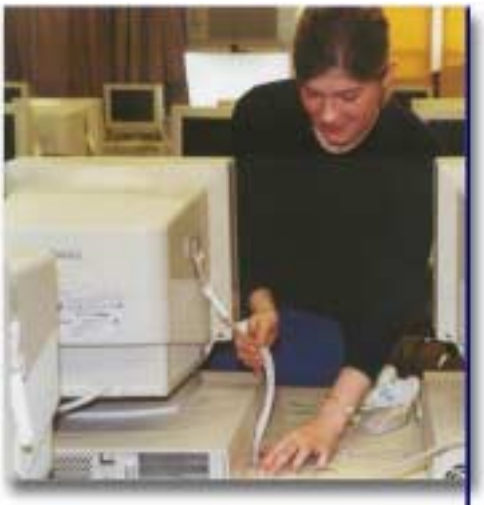
SEATTLE PROJECT IMPACT RECEIVES TWO NATIONAL AWARDS FOR ITS HOME AND SCHOOL RETROFIT PROGRAMS!

The Western States Seismic Policy Council (WSSPC) recognized Seattle Project Impact with two of their nine National Awards in Excellence at the September/2000 WSSPC National Earthquake Risk Management Conference. The **Home Retrofit** program won the Award for Educational Outreach to the General Public and the **School Retrofit** program won the Award for Mitigation Efforts.

Earthquake damage.

Award #1: Seattle Project Impact's Home Retrofit program is a comprehensive solution to strengthen older wood-frame homes against earthquake damage. **Home Retrofit**, now a Regional program, provides resources to the more than 250,000 homes that need to be bolted to the foundation and have pony/sheer

walls reinforced against lateral ground motion. This Pacific Northwest style of construction is similar to the California homes which sustained much damage in the 1989 Loma Prieta and 1994 Northridge Earthquakes.



UW student straps down computer equipment.

Award #2: Seattle Project Impact's School Retrofit program is divided into three areas of focus: ***Overhead Hazard Removal, Nonstructural Retrofit, and Automatic Gas Shut-offs***. School Retrofit has been extensively successful in the year and a half since its launch. The Seattle School District has concentrated on large structural projects to either replace or seismically strengthen facilities. Through School Retrofit, special attention has been paid to seismically securing nonstructural items such as bookshelves, furniture, computers, televisions, and other equipment. Unsecured nonstructural items cause the majority of injuries during an earthquake. Seattle has nonstructurally retrofitted one school per month since early 2000 using volunteers and PTA members. The school district has also been active in mentoring other communities as far away as Kenai, Alaska.

Inspecting damage.

The Nisqually Quake

A magnitude 6.8 earthquake struck the Puget Sound region of Washington State on February 28, 2001. The earthquake's epicenter was located near the Nisqually delta area of southern Puget Sound at a depth of 52 km. The quake caused a reported 250 injuries, one death due to heart attack, and damaged numerous structures.

Ground motions were moderate because of the depth of the earthquake and structural damage to buildings was not widespread. Modern buildings (those constructed to modern codes) and those that had been recently seismically upgraded performed well structurally. Building codes were significantly improved after the 1971 San Fernando earthquake and buildings built to code since that time have generally performed well in earthquakes. Most of the structural damage to buildings occurred in older, unretrofitted, unreinforced masonry structures.